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DIFFERENTIAL GEARING UNIT FOR A VEHICLE

BACKGROUND OF THE INVENTION AND RELATED ART STATEMENT

The present invention relates to a differential gearing unit for a vehicle, and in particular, to such a differential gearing unit including a torque responsive differential limiting function.

A differential gearing unit for a vehicle comprising an internal gear having internal teeth formed around an inner peripheral surface thereof, a sun gear disposed inside the internal gear concentrically therewith, a plurality of planet gears disposed between the internal gear and the sun gear in meshing engagement with both gears, and a planetary carrier for carrying the planet gears for revolution around the axis of rotation of the internal gear and the sun gear while allowing each of the planet gears to revolve on its own axis and constructed such that the planetary carrier is connected to a shaft which transmits a drive from an engine while the internal gear and the sun gear are connected to front and rear wheels of a four-wheel drive vehicle is known in the art.

Fig. 5 shows an example of a differential gearing unit for a vehicle as mentioned above, which is disclosed in Japanese Patent Application No. 2001-244,146 filed by the present applicant. Describing the construction of this prior art differential gearing unit with reference to Fig. 5, a housing 102 (102A, 102B) contains an internal gear 104 and a sun gear 106 disposed concentrically inside the internal gear 104. A plurality of planet gears 108 carried by a planetary carrier 110 are disposed between the internal gear 104 and the sun gear 106 in meshing engagement with both gears 104 and 106. In this example, all of the internal gear 104, the sun gear 106 and the planet gears 108 have twisted gear